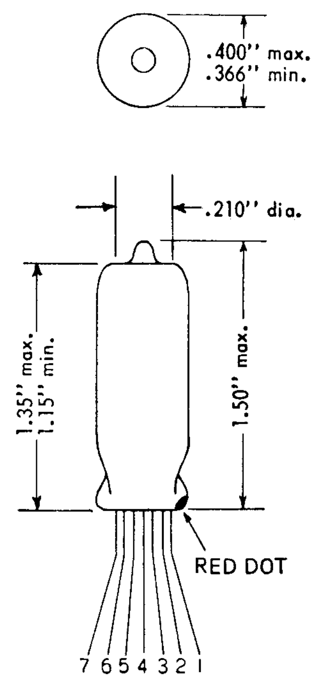
TYPE CK6245

The CK6245 is a heater-cathode type sharp-cutoff pentode of subminiature construction capable of operation in the UHF region. The characteristics of this type are controlled to give uniform performance at low voltages. This tube is characterized by long life and stable performance. It is designed for service where severe conditions of high temperature and mechanical shock or vibration are encountered. A separate terminal connection is provided for Grid #3, which under self-bias conditions can be connected directly to ground, permitting the cathode by-pass capacitor to be omitted for lower grid loading. The flexible terminal leads may be soldered or welded directly to circuit components without the use of sockets. Standard subminiature sockets may be used by cutting the leads to 0.20" length.



MECHANICAL DATA

ENVELOPE: T-3 Glass

BASE: None (0.016" tinned flexible leads. Length: 1.5" min. Spacing: 0.048" center-to-center)

TERMINAL CONNECTIONS: *(Red dot is adjacent to lead 1)*

Lead 1	Plate	Lead 5	Grid #3
Lead 2	Grid #2	Lead 6	Cathode
Lead 3	Heater	Lead 7	Grid #1
Lead 4	Heater		

MECHANICAL RATINGS:

Maximum Impact Acceleration (Shock Test-Note 3)	450 G
Maximum Uniform Acceleration (Centrifuge Test-Note 4)	1000 G
Maximum Vibrational Acceleration (96 Hour Fatigue Test-Note 5)	2.5 G
Maximum Bulb Temperature	265 °C

MOUNTING POSITION: Any

ELECTRICAL DATA

CAUTION - To electronic equipment design engineers: Special attention should be given to the temperatures at which the tubes are to be operated. Reliability will be seriously impaired if maximum bulb temperature is exceeded. The life expectancy may be reduced if conditions other than those specified for life test are imposed on the tube and will be reduced appreciably if absolute maximum ratings are exceeded. Both reliability and performance will be jeopardized if filament voltage ratings are exceeded. Life and reliability of performance are directly related to the degree that regulation of the heater voltage is maintained at its center rated value.

RATINGS AND NORMAL OPERATION:	MIL-E-1B SYMBOL	ABSOLUTE MINIMUM	NORMAL TEST CONDITIONS (Note 7)	NORMAL OPERATION (Note 6)	ABSOLUTE MAXIMUM	MIL-E-1B UNITS
Heater Voltage (Note 8)	Ef:	5.7	6.3	6.3	6.9	V
Plate Voltage	Eb:		120	20	200	Vdc
Grid #1 Voltage	Ec1:	-55	0	0	0	Vdc
Grid #2 Voltage	Ec2:		120	30	155	Vdc
Grid #3 Voltage	Ec3:		0	0	0	Vdc
Plate Dissipation	Pp:			0.05	1.85	W
Grid #2 Dissipation	Pg2:			0.03	0.55	W
Grid #1 Circuit Resistance	Rg1:			1.0		Meg.
Heater-Cathode Voltage	Ehk:	-200		100	+200	Vdc
Cathode Current	Ik:	0.5			20	mAdc
Cathode Resistance	Rk:		200	0		ohms

Tentative Data

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ELECTRICAL DATA (continued)

CHARACTERISTICS AND QUALITY CONTROL TESTS (Note 1)

TEST	CONDITIONS	AQL %	MIL-E-1B SYMBOL	MIN.	LAL	BOGIE	UAL	MAX.	ALD	MIL-E-1B UNITS
Continuity & Tap Shorts:		0.4								
ACCEPTANCE TESTS GROUP A.		**COMBINED AQL = 2.5%**								
Heater Current:		0.65	If:	183		200		217		mA
Heater-Cathode Leakage (1):	Ehk=+ 100 Vdc	0.65	Ihk (1):					7		µAdc
Heater-Cathode Leakage (2):	Ehk= - 100 Vdc	0.65	Ihk (2):					-7		µAdc
Grid Current (1):		0.65	Ic1 (1):					-0.1		µAdc
Plate Current (1):		0.65	Ib (1):	5.5	6.9	7.5	8.1	9.5	2.3	mAdc
Plate Current (2):	Ec1= - 9.0 Vdc	0.65	Ib (2):					50		µAdc
Transconductance (1):		0.65	Sm (1):	4200	4775	5000	5225	5800	860	µmhos
Transconductance (3):	Eb= 20 Vdc: Ec2= 30 Vdc: Ec1= Ec3= 0; Rg1= 500 ohms max; Rk= 0.	0.65	Sm (3):	2250		3275		4300		µmhos
Plate Current (3):	Eb= 20 Vdc; Ec2 = 30 Vdc; Ec1= Ec3= 0; Rg1= 500 ohms max. Rk= 0.	0.65	Ib (3):	1.0		2.5		4.0		mAdc
Screen Current (2):	Eb= 20 Vdc; Ec2= 30 Vdc; Ec1= Ec3= 0; Rg1= 500 ohms max. Rk= 0.	0.65	Ic2 (2):					1.5		mAdc
ACCEPTANCE TESTS GROUP B										
Insulation of Electrodes:	Ef= 6.3 V									
	Eg-all= - 100 Vdc	2.5	Rg1-all:	100						Meg.
	Ep-all= - 300 Vdc	2.5	Rp-all:	100						Meg.
Screen Current:		2.5	Ic2 (1):	1.7	2.4	2.6	2.8	3.5	0.8	mAdc
Transconductance (2):	Ef= 5.5 V (Note 9)	2.5	ΔSm (2):					10		%
AF Noise:	Esig = 50 mVac; Rg1= 0.1 Meg; Ec2= 19 Vdc; Rg2 = 1000 ohms; Rp= 0.2 Meg.	2.5	EB:					17		VU
Vibration:	F= 40 cps; G= 15; Rp= 10,000 ohms	2.5	Ep:					50		mVac
Subminiature Lead Fatigue Test:		2.5		4.0						arcs
ACCEPTANCE TESTS GROUP C										
Grid Current (2):	After 5 minutes at Ef= 7.0 V; measure grid current at Ef= 7.0 V; 3 minute test not permitted.	6.5	Ic1 (2):					-0.1		µAdc
Plate Resistance:		6.5	Rp:	0.15						Meg.
Capacitance:			Cg1p:					0.03		µµf
Capacitance:	(Note 2)	6.5	Cin:	3.6		4.35		5.1		µµf
Capacitance:			Cout:	2.6		3.15		3.7		µµf

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ELECTRICAL DATA (continued)

CHARACTERISTICS AND QUALITY CONTROL TESTS (continued)

TEST	CONDITIONS	AQL %	MIL-E-1B SYMBOL	MIN.	MAX.	MIL-E-1B UNITS
ACCEPTANCE TESTS GROUP D						
Shock	Hammer Angle = 30°; Note 3					
Post Shock Limits:						
Vibration:	F = 40 cps; G = 15; Rp = 10,000 ohms		Ep:		100	mVac
Heater-Cathode Leakage (1):	Ehk = +100 Vdc		Ihk (1):		20	μAdc
Heater-Cathode Leakage (2):	Ehk = -100 Vdc		Ihk (2):		-20	μAdc
Transc. (1) change of individual tubes from initial:	Ef = 6.3 V		ΔSm (1):		20	%
Fatigue:	96 Hours; Note 5					
Post Fatigue Limits:						
Vibration:	F = 40 cps; G = 15; Rp = 10,000 ohms		Ep:		100	mVac
Heater-Cathode Leakage (1):	Ehk = +100 Vdc		Ihk (1):		10	μAdc
Heater-Cathode Leakage (2):	Ehk = -100 Vdc		Ihk (2):		-10	μAdc
Transc. (1) change of individual tubes from initial:	Ef = 6.3 V		ΔSm (1):		15	%
ACCEPTANCE TESTS GROUP E						
Glass Strain (Thermal Shock):		10				
Visual and Mechanical Inspection:	Major Combined	0.4				
	Minor A Combined	2.5				
	Minor B Per Item	6.5				
ACCEPTANCE LIFE TESTS						
Heater Cycle:	Ef = 7.5 V; Eb = Ec1 = Ec2 = Ec3 = 0V; Ehk = 140 Vac; 1 min. on, 1 min. off			2000		cycles
1 Hour Stability Life Test:	TA = room; Ehk = +200 Vdc; Rg1 = 1.0 Meg.					
1 Hour Stability Life Test End Points:						
Transc. (1) change of individual tubes from initial:	(Typical sample size = 25 tubes)	10	ΔSm (1):		8.0	%
100 Hour Survival Rate Life Test:	TA = room; Ehk = +200 Vdc; Rg1 = 1.0 Meg.					
100 Hour Survival Rate Life Test End Points:						
Inoperatives:	(Typical sample size = 200 tubes)	0.4				
Transcond. (1):	(Typical sample size = 25 tubes)	1.0	Sm (1):	3250		μmhos

TEST	CONDITIONS	AQL %	MIL-E-1B SYMBOL	MIN.	MAX.	MIL-E-1B UNITS	Max. defects per characteristics
500 Hour Intermittent High Temperature Life Test (1):	TA = 200° C; Ehk = +200 Vdc; Rg1 = 1.0 Meg. (Typical sample size = 20 tubes)						
500 Hour Intermittent High Temperature Life Test (1) End Points:	(Total allowable combined defects = 4 tubes)						
Inoperatives:							1
Heater Current:			If:	183	217	mA	4
Heater Cathode Leakage (1):			Ihk (1):	0	10	μAdc	2
Heater Cathode Leakage (2):			Ihk (2):	0	-10	μAdc	2
Grid Current (1):			Ic1 (1):	0	-0.3	μAdc	2
Grid Current (2):			Ic1 (2):	0	-0.3	μAdc	2
Transc (1) change of individual tubes from initial:			ΔSm (1):		25	%	1

ELECTRICAL DATA (continued)

CHARACTERISTICS AND QUALITY CONTROL TESTS (continued)

TEST	CONDITIONS	AQL %	MIL-E-1B SYMBOL	MIN.	MAX.	MIL-E-1B UNITS	Max. defects per characteristics
Transc. (2) change of individual tubes from Ef= 6.3 to 5.5 V:			ΔSm (2):		15	%	4
Insulation of Electrodes:			Rg1-all:	50		Meg.	4
Insulation of Electrodes:			Rp-all:	50		Meg.	4
5000 Hour Intermittent Life Test (2):	TA=room; Ehk=+200 Vdc; Rg1=1.0 Meg.						
5000 Hour Intermittent Life Test (2) End Points:	Read for same characteristics as for Life Test (1). Limits not established.						

NOTES

Note 1: Characteristics, Quality Control Test Procedures, and Inspection Levels are made according to the appropriate paragraphs of MIL-E-1B, "Inspection Instructions for Electron Tubes" and MIL-STD-105A.

Note 2: With a cylindrical shield (0.405" I.D. - 1 7/8" long) connected to lead 6.

Note 3: Test conditions and acceptance criteria per shock Test procedures of MIL-E-1B basic specification.

Note 4: Centrifuge Test with forces applied in any direction.

Note 5: Test conditions and acceptance criteria per Fatigue Test procedures of MIL-E-1B basic specifications.

Note 6: These normal values represent conditions at which control of reliability may be expected.

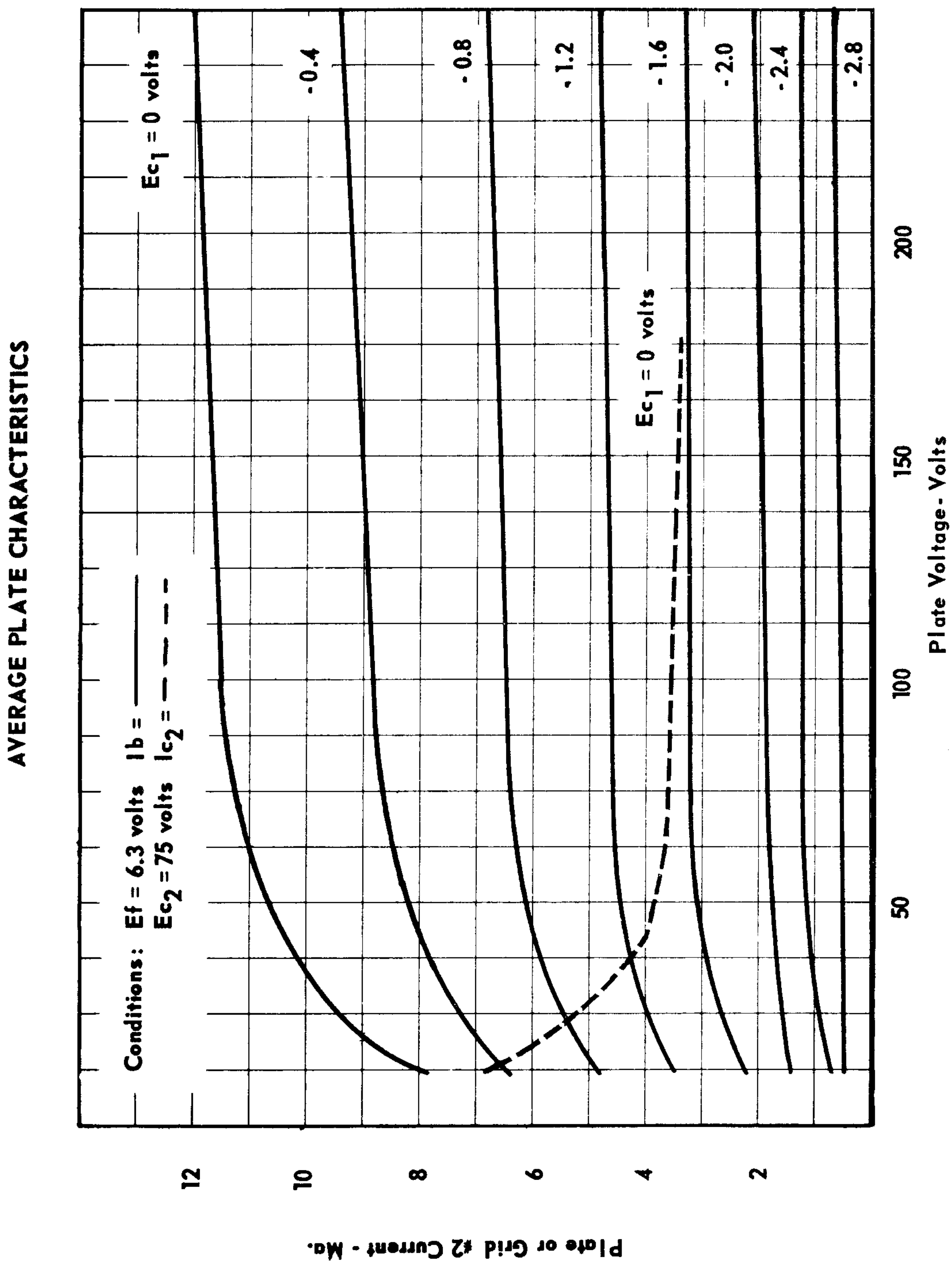
Note 7: These normal test conditions are used for all characteristic tests unless otherwise stated under the individual test item.

Note 8: For most applications the performance will not be adversely affected by ± 10% heater voltage variation, but when the application can provide a closer control of heater voltage, an improvement in reliability will be realized.

Note 9: Change of transconductance for individual tubes from that value measured at Ef= 6.3 V to that value measured at Ef= 5.5 V.

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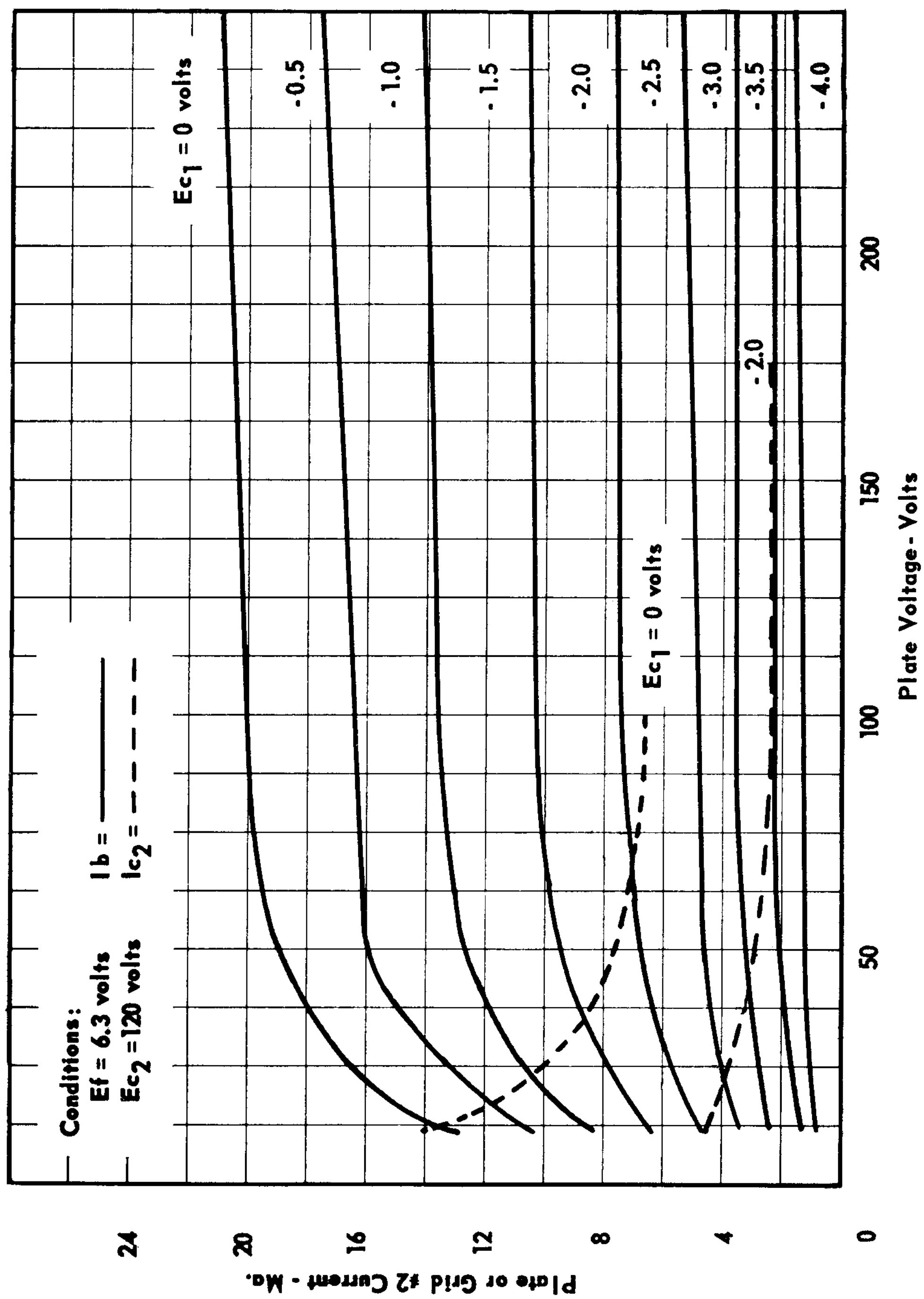
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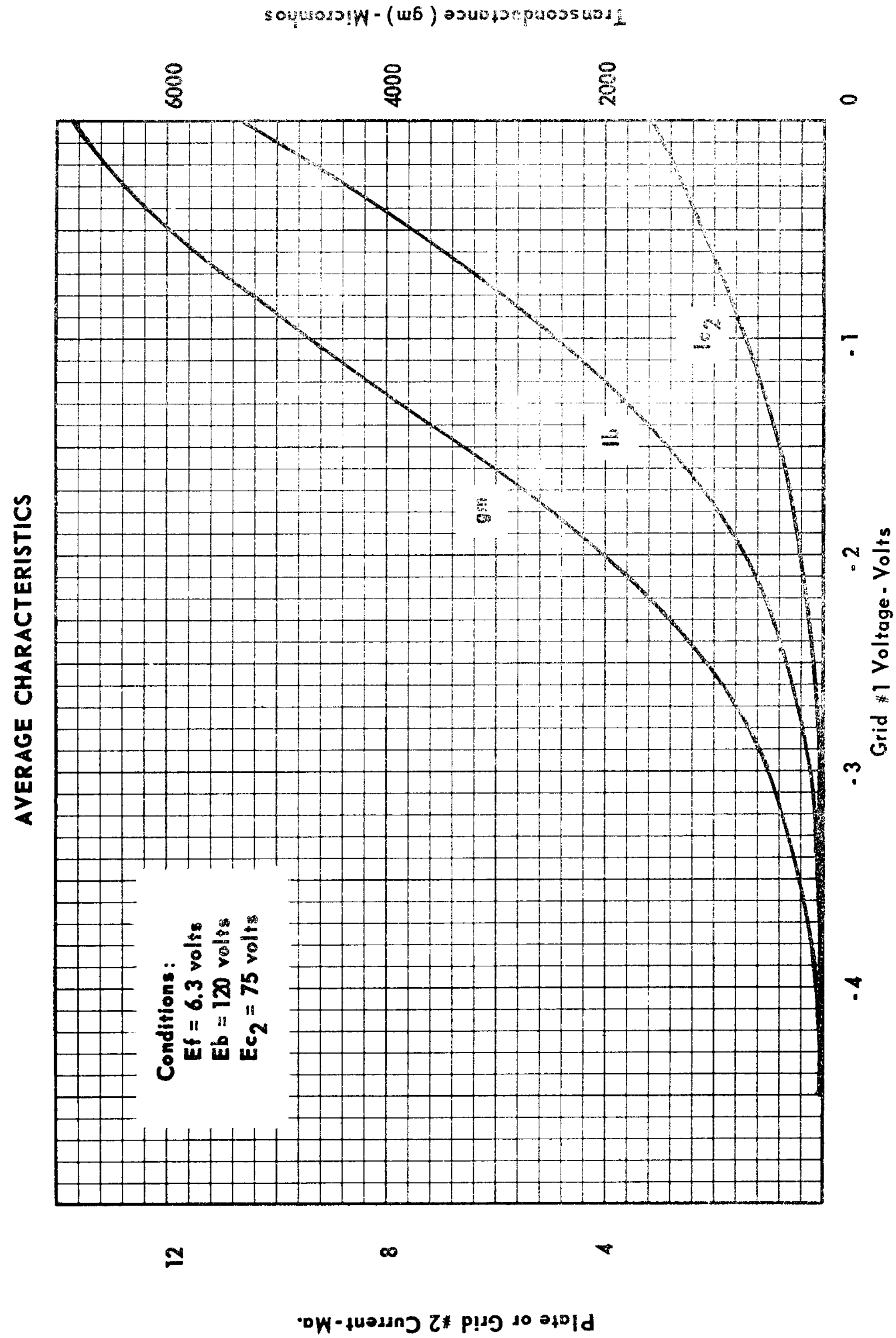


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AVERAGE PLATE CHARACTERISTICS

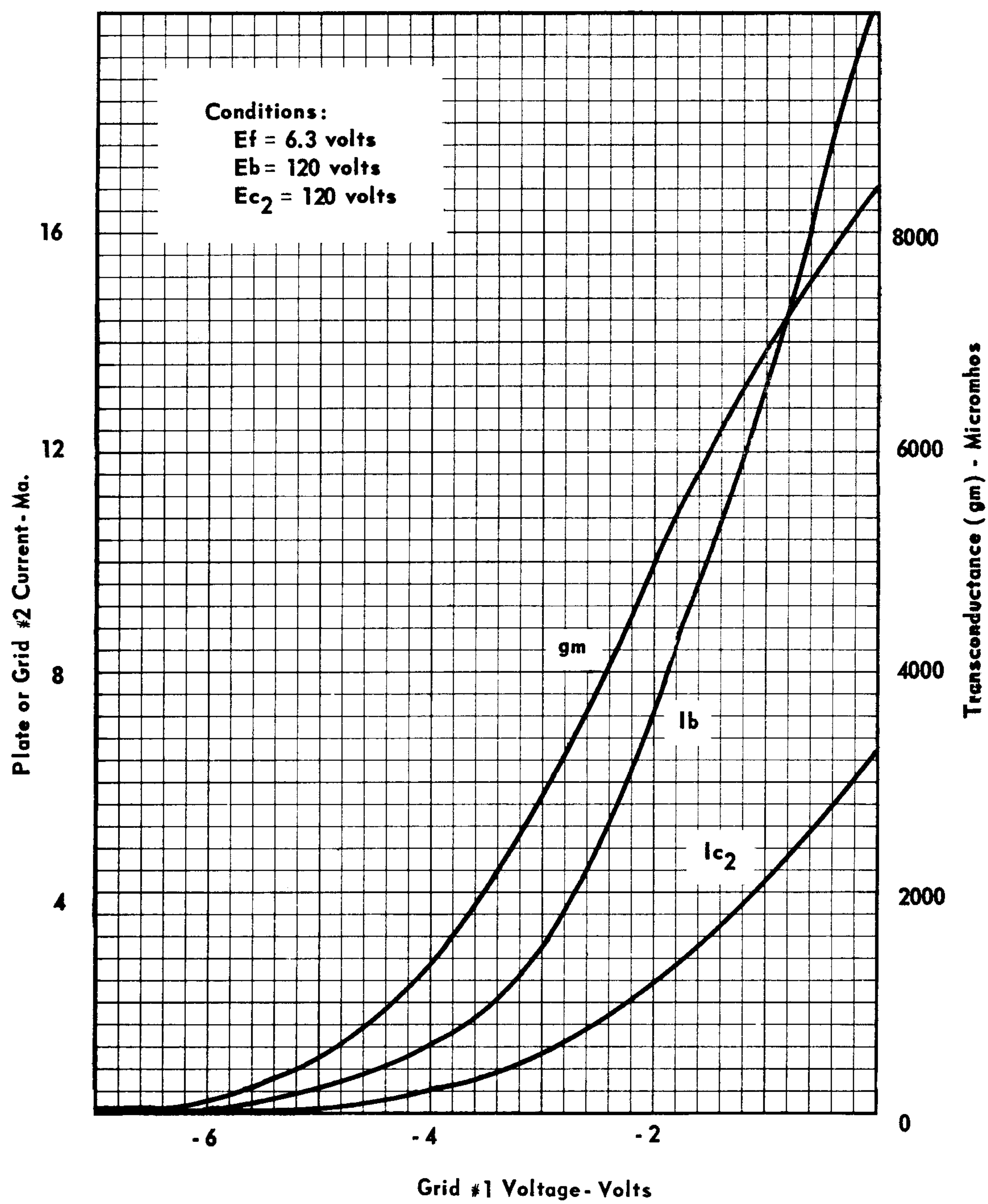



AVERAGE CHARACTERISTICS
Transconductance (gm) - Micromhos
6000
4000
2000
0
-1
-2
-3
-4
Grid #1 Voltage - Volts
12
8
4
Plate or Grid #2 Current-Ma.
gm
Ib
Ic2
Conditions:
Ef = 6.3 volts
Eb = 120 volts
Ec2 = 75 volts

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AVERAGE CHARACTERISTICS



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RECEIVING AND CATHODE RAY TUBE OPERATIONS

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